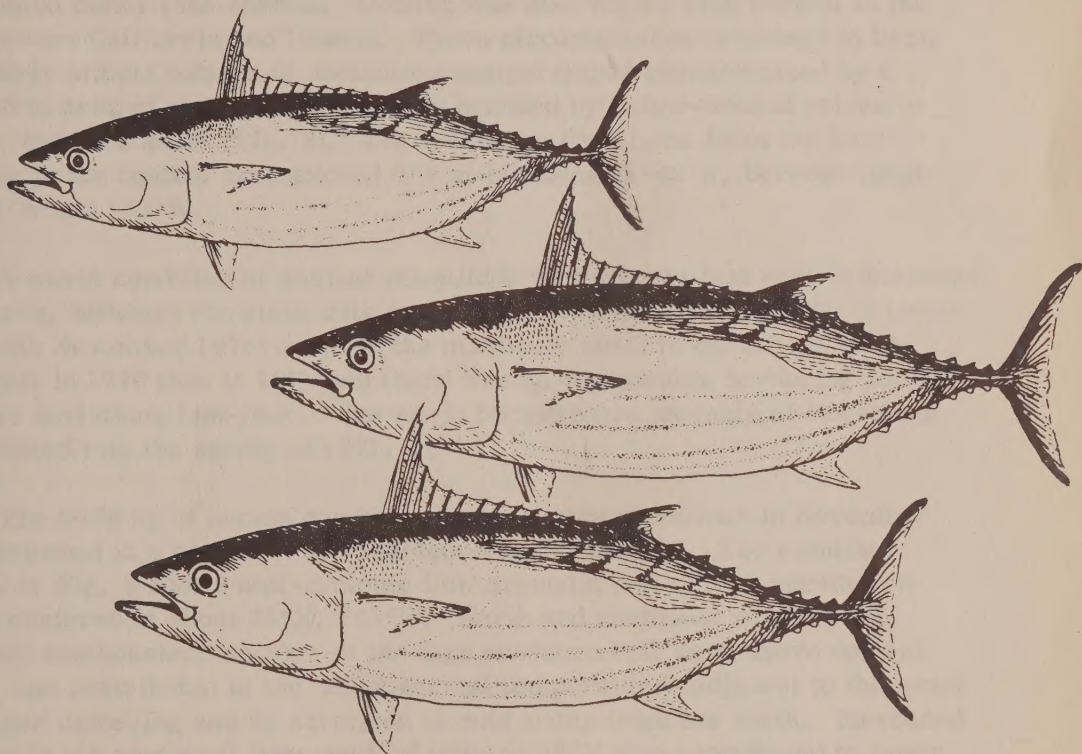




FISHING INFORMATION

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



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NARRATIVE DESCRIPTION OF OCEAN TEMPERATURE CONDITIONS

Northeastern Pacific

Surface waters in the central portion of the eastern North Pacific cooled at less than the normal seasonal rate in November 1971, while waters in the coastal zone from the Gulf of Alaska to Baja California, out to several hundred miles, cooled faster than normal. Cooling was also higher than normal in the region between California and Hawaii. These circumstances combined to bring about a fairly simple pattern of anomalous temperatures characterized by a large central area of above-normal values bounded by below-normal values to the north, east and south (Fig. 3). The maximum deviations from the long term mean in the central area exceed 6°F at latitudes $41\text{--}43^{\circ}\text{N}$, between longitudes 166°W and 168°W .

A warm condition of similar magnitude was present last year in the same general area, although the similarity is not immediately obvious in Fig. 4 (comparison with November 1970) because the maximum positive deviations were farther west in 1970 than in 1971 and there was no comparable bordering zone of negative deviations last year. The warm temperature anomaly of November 1970 persisted into the spring of 1971.

The build up of anomalous ocean temperature conditions in November can be attributed in a general way to meteorological factors. The resultant wind field in Fig. 9 shows anti-cyclonic flow around a cell of high barometric pressure centered at about 35°N , 145°W . North and northeast winds in the eastern and southeastern sectors of the high pressure cell were above normal strength, and contributed to the below normal temperatures adjacent to the coast by increased upwelling and by advection of cold water from the north. Increased cloudiness in the northeast flow south of latitude 25°N also contributed to lower sea temperatures by inhibiting solar insolation. In the western sector of the high pressure cell, stronger-than-normal southwest winds retarded seasonal cooling through northward advection of warm water. Also, low evaporation and low conductive heat loss to the relatively warm, humid southerly winds helped to induce above-normal temperatures in the region between latitudes 30°N and 45°N , from 145°W to 160°W .

The resultant wind and mean pressure patterns in Fig. 9 are a summation of events throughout the month. One of the most significant events affecting the anomalously warm conditions shown in Fig. 3 was the intensification of the eastern North Pacific High beginning at mid-month, and the simultaneous occurrence of a very deep low pressure system which approached from the west at about 45°N and moved gradually northeastward to the Alaska Peninsula. The intense gradients between the centers of high and low pressure produced unusually strong southwest winds for several days over an extensive area.

Eastern Tropical Pacific

Sea surface temperatures along the Central American coast continued to be higher than 84°F from C. Corrientes to San Jose and beyond (Fig. 5). Since this area usually cools slightly in November, the deviations from the long term mean which were already positive in October increased to more than 2°F (Fig. 6) as light winds and near-normal cloud cover persisted during the month. Temperatures around the Revillagigedo Island dropped about 3°F from October means, producing negative deviations in that area because of extensive low stratus and persistent northerly winds over 12 knots. Farther south, in the region around Clipperton Island, the rate of cooling was reduced sufficiently to reverse most of the negative departures which were present in October. In this area light winds and relatively little storm development on the ITCZ contributed to a reduction in ocean mixing.

West of longitude 115°W , between latitudes 10°N and 20°N , anomalous conditions changed from mostly positive to mostly negative but, except in an area near 140°W , the magnitude of deviations from normal were less than 2°F indicating a return to normal conditions.

Colder than normal condition persisted along the equator from the Galapagos Islands to longitude 145°W , with deviations in the range 2°F to 4°F . Persistent southeast trades from 12 to 15 knots contributed to considerable equatorial upwelling in this region.

SEA SURFACE TEMPERATURE CHARTS, PACIFIC OCEAN

NOVEMBER 1971

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MARIETTE, MARY BARBARA, UNITED STATES

Charts

Figure 1. -- Mean sea surface temperature, eastern north Pacific Ocean. Squares show temperatures at weather ship stations. Numerals on shore are temperatures at coastal and lightship stations.

Figure 2. -- Mean sea surface temperature chart, western north Pacific Ocean.

Figure 3. -- Deviation of sea surface temperatures, eastern north Pacific Ocean from long term charts of H. O. 225. Hatched areas are colder in 1971.

Figure 4. -- Deviation of sea surface temperatures, eastern north Pacific Ocean from those of November 1970. Hatched areas are colder in 1971.

Figure 5. -- Mean sea surface temperature, eastern tropical Pacific Ocean. Numerals on shore are temperatures at coastal stations.

Figure 6. -- Deviation of sea surface temperatures, eastern tropical Pacific Ocean from long-term charts of H. O. 225 and NAVOCEANO sp-123. Shaded areas are colder in 1971. Contours are dashed in sparse data areas.

Figure 7. -- Deviation of sea surface temperatures, eastern tropical Pacific Ocean from those of November 1970. Shaded areas are colder in 1971. Contours are dashed in sparse data areas.

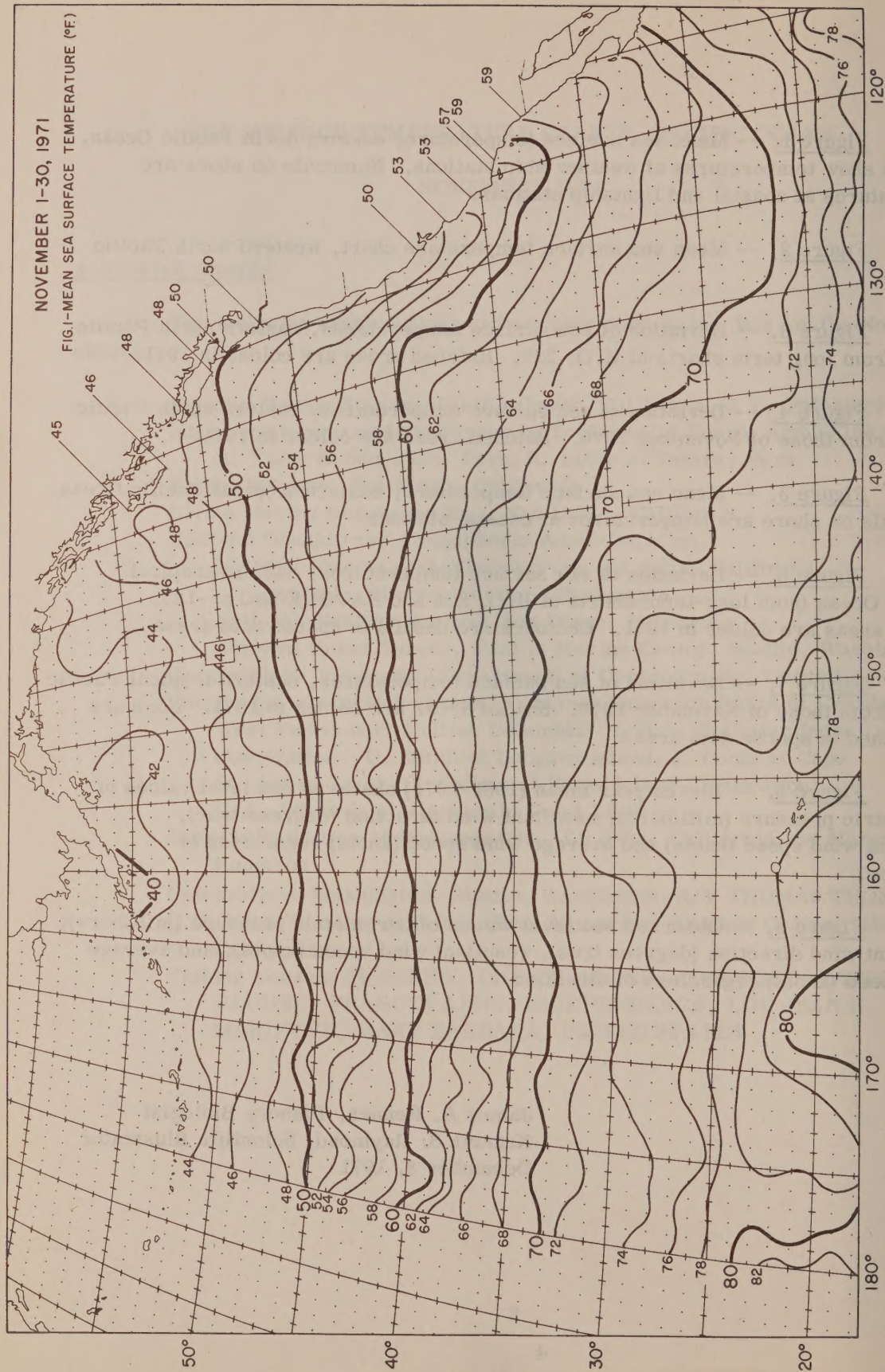
Figure 8. -- Eleven year mean (1961-1971) observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots) and average wind speed (knots) regardless of direction.

Figure 9. -- Observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots), and average wind speed (knots) regardless of direction.

James A. Renner, Fishery Biologist
Kenneth S. Raymond, Scientific Illustrator
December 8, 1971

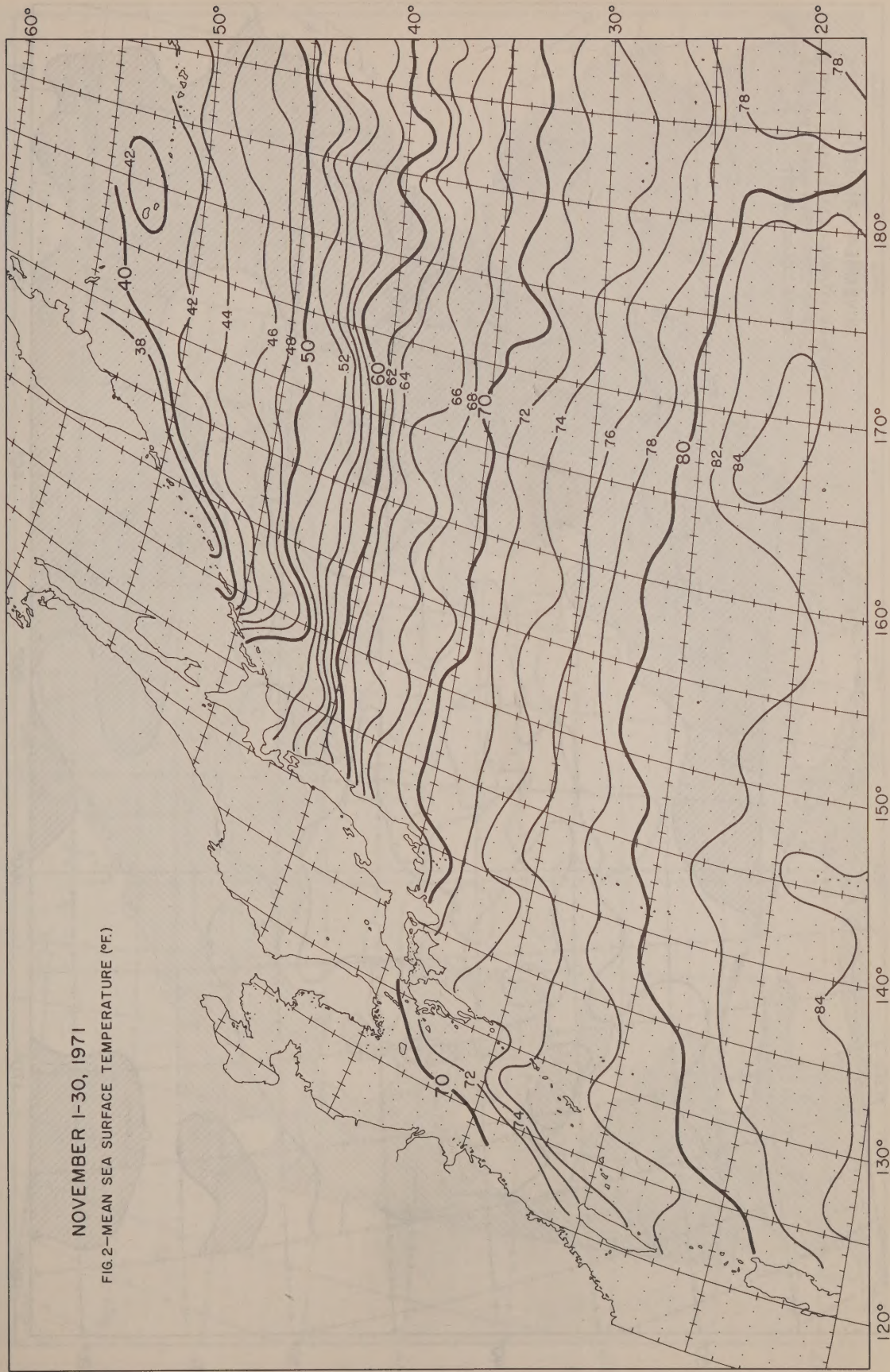
NOVEMBER 1-30, 1971

FIG 1-MEAN SEA SURFACE TEMPERATURE (°F)



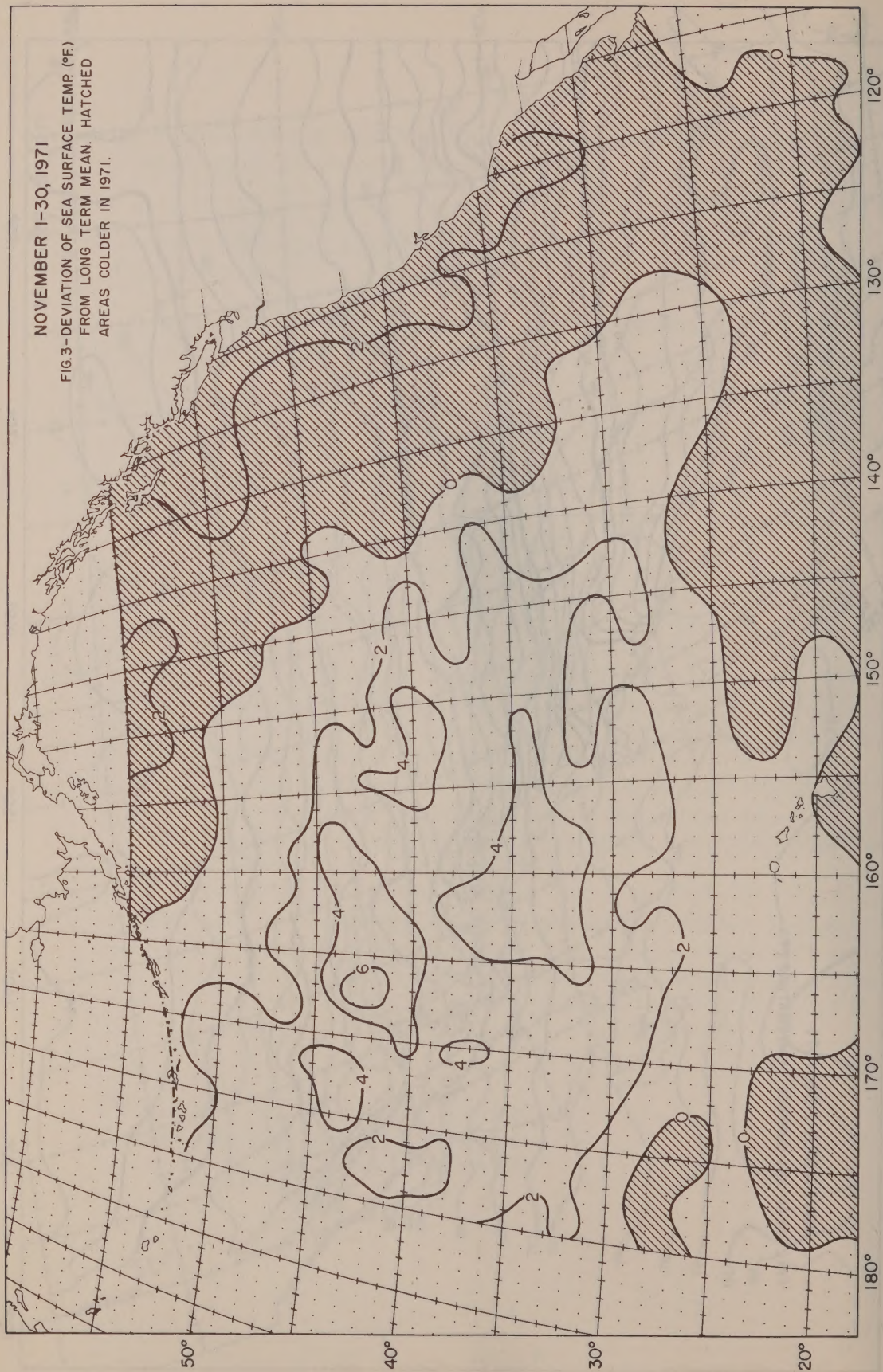
NOVEMBER 1-30, 1971

FIG.2—MEAN SEA SURFACE TEMPERATURE (°F.)



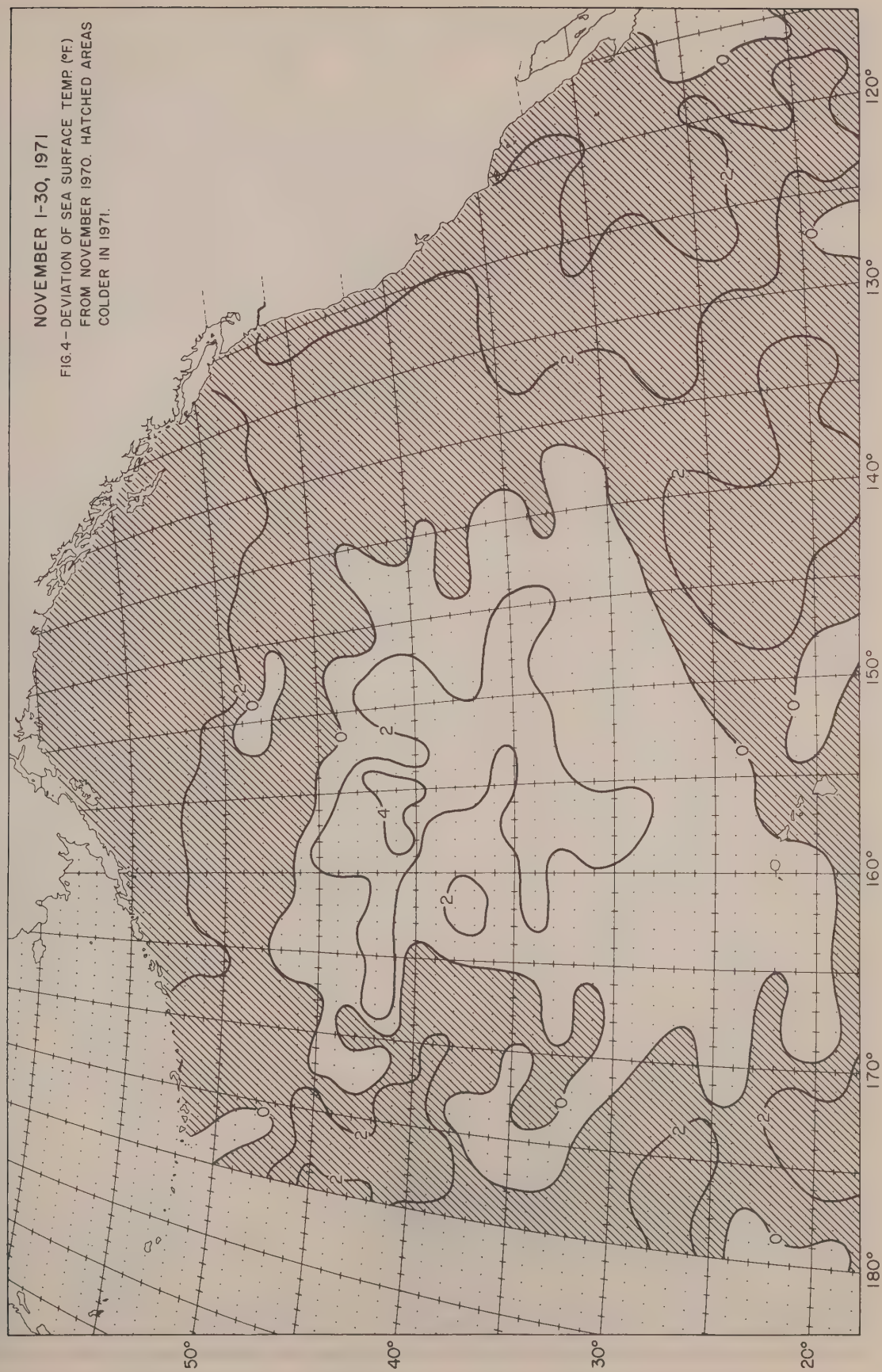
NOVEMBER 1-30, 1971

FIG. 3-DEVIATION OF SEA SURFACE TEMP. (°F.)
FROM LONG TERM MEAN. HATCHED
AREAS COLDER IN 1971.



NOVEMBER 1-30, 1971

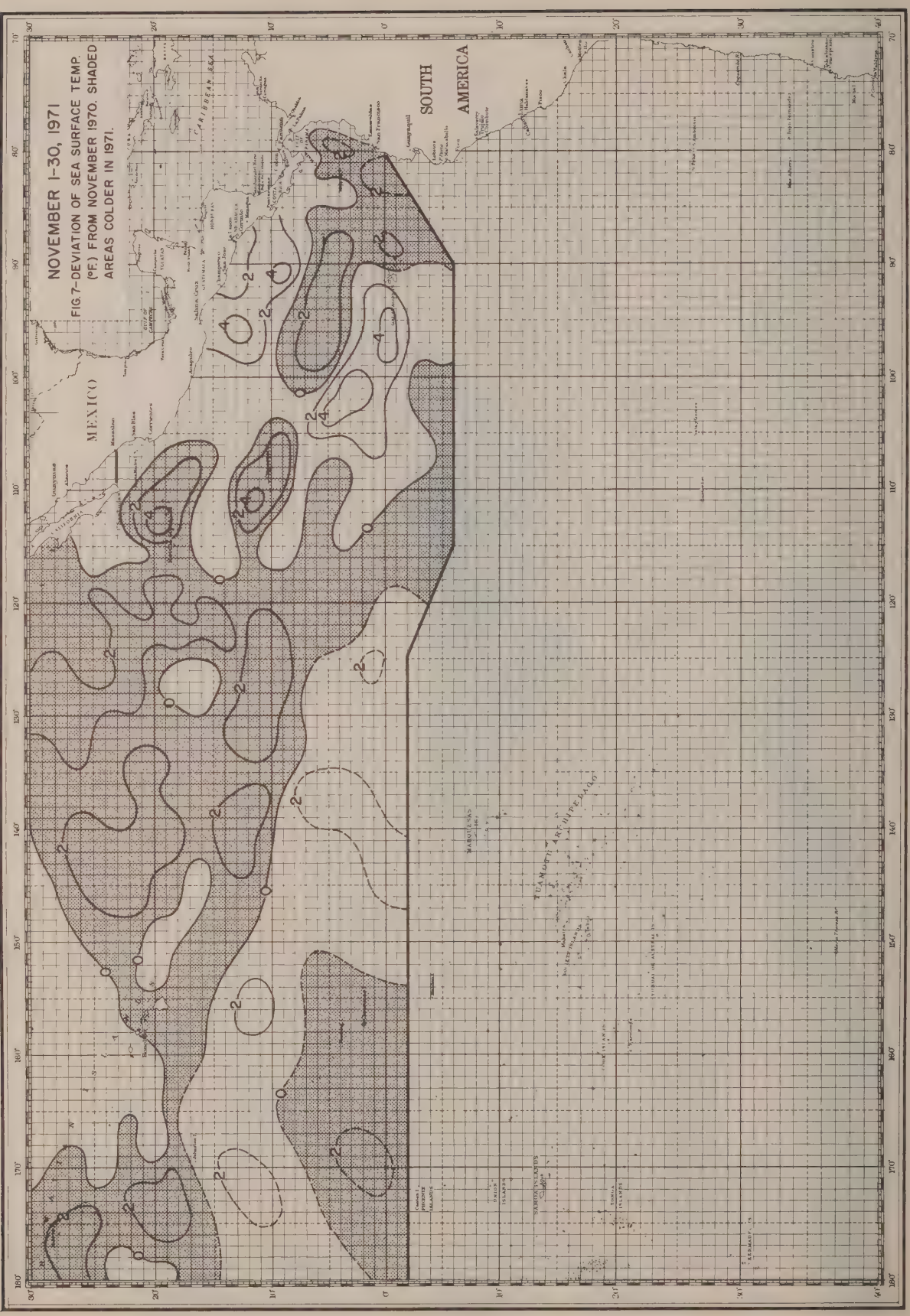
FIG 4- DEVIATION OF SEA SURFACE TEMP. (°F)
FROM NOVEMBER 1970. HATCHED AREAS
COLDER IN 1971.



NOVEMBER 1-30, 1971
 FIG 5-MEAN SEA SURFACE TEMPERATURE
 (°F). DASHED LINES INDICATE
 SPARSE DATA.



NOVEMBER 1-30, 1971
 FIG. 7- DEVIATION OF SEA SURFACE TEMP.
 (°F) FROM NOVEMBER 1970. SHADED
 AREAS COLDER IN 1971.



NOVEMBER 1961-1971

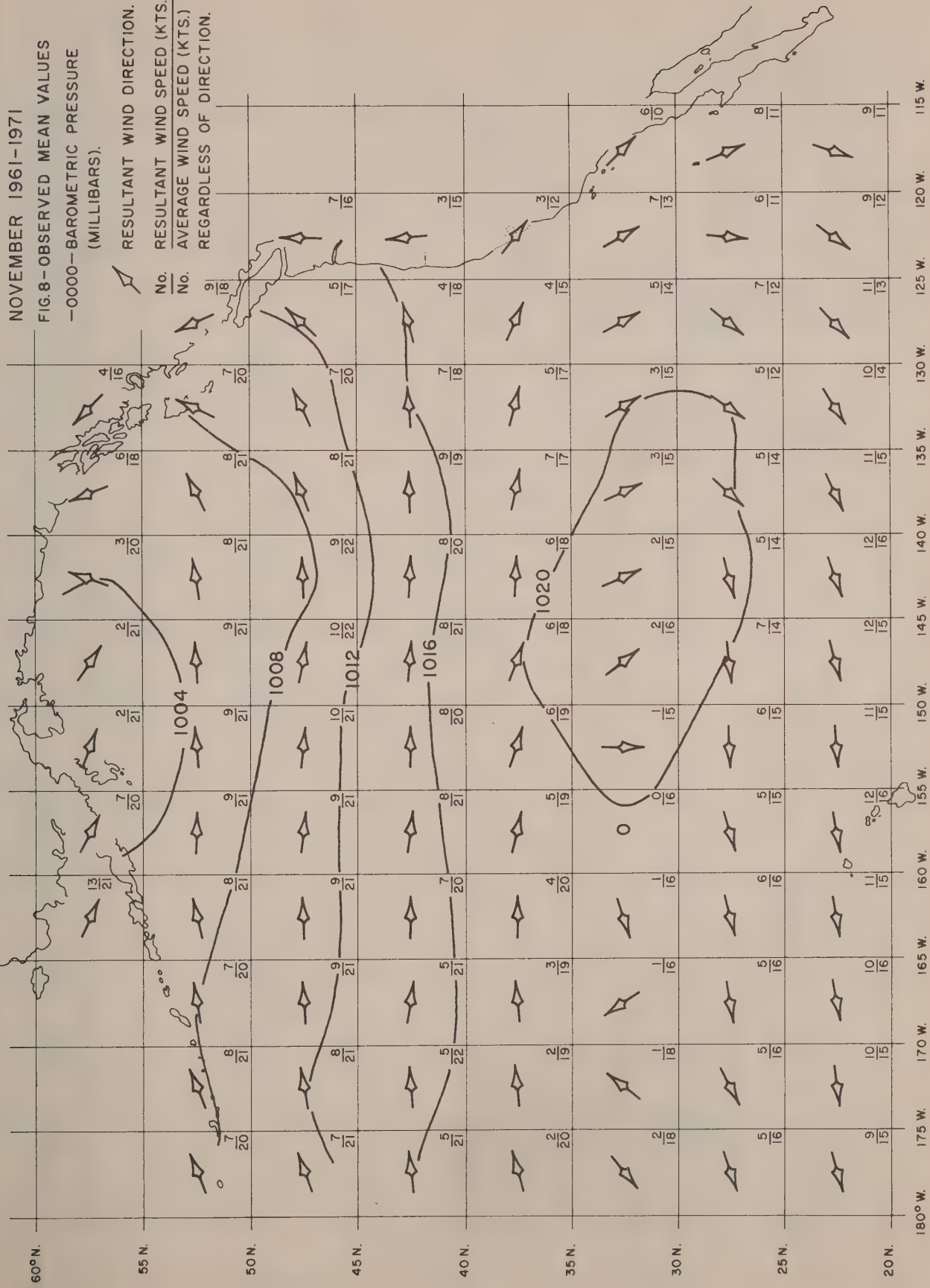
FIG. 8-OBSERVED MEAN VALUES

-0000-BAROMETRIC PRESSURE
(MILLIBARS).

RESULTANT WIND DIRECTION.

No.
 RESULTANT WIND SPEED (KTS.).

No.
 AVERAGE WIND SPEED (KTS.)
REGARDLESS OF DIRECTION.



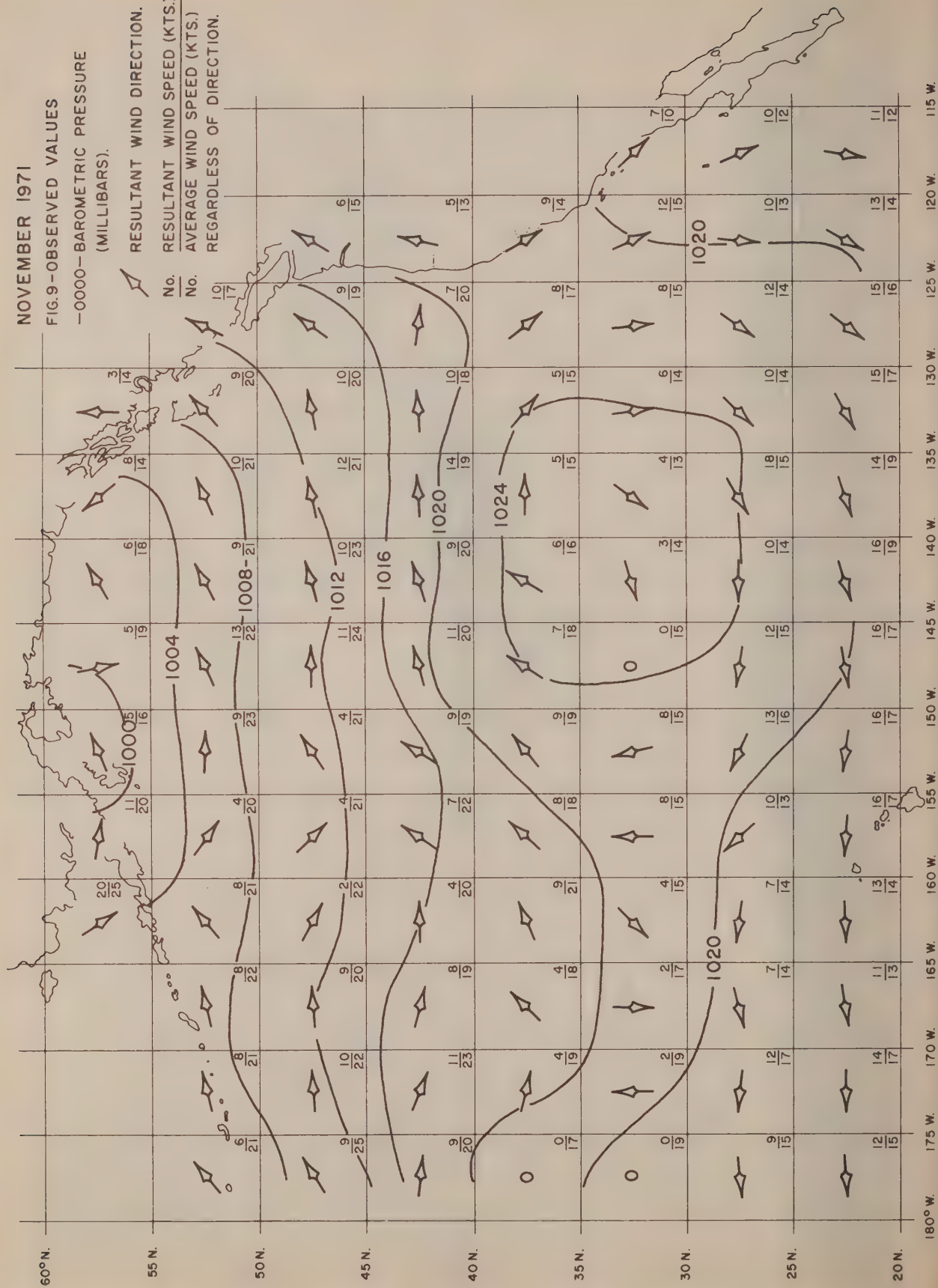
NOVEMBER 1971

FIG.9-OBSERVED VALUES

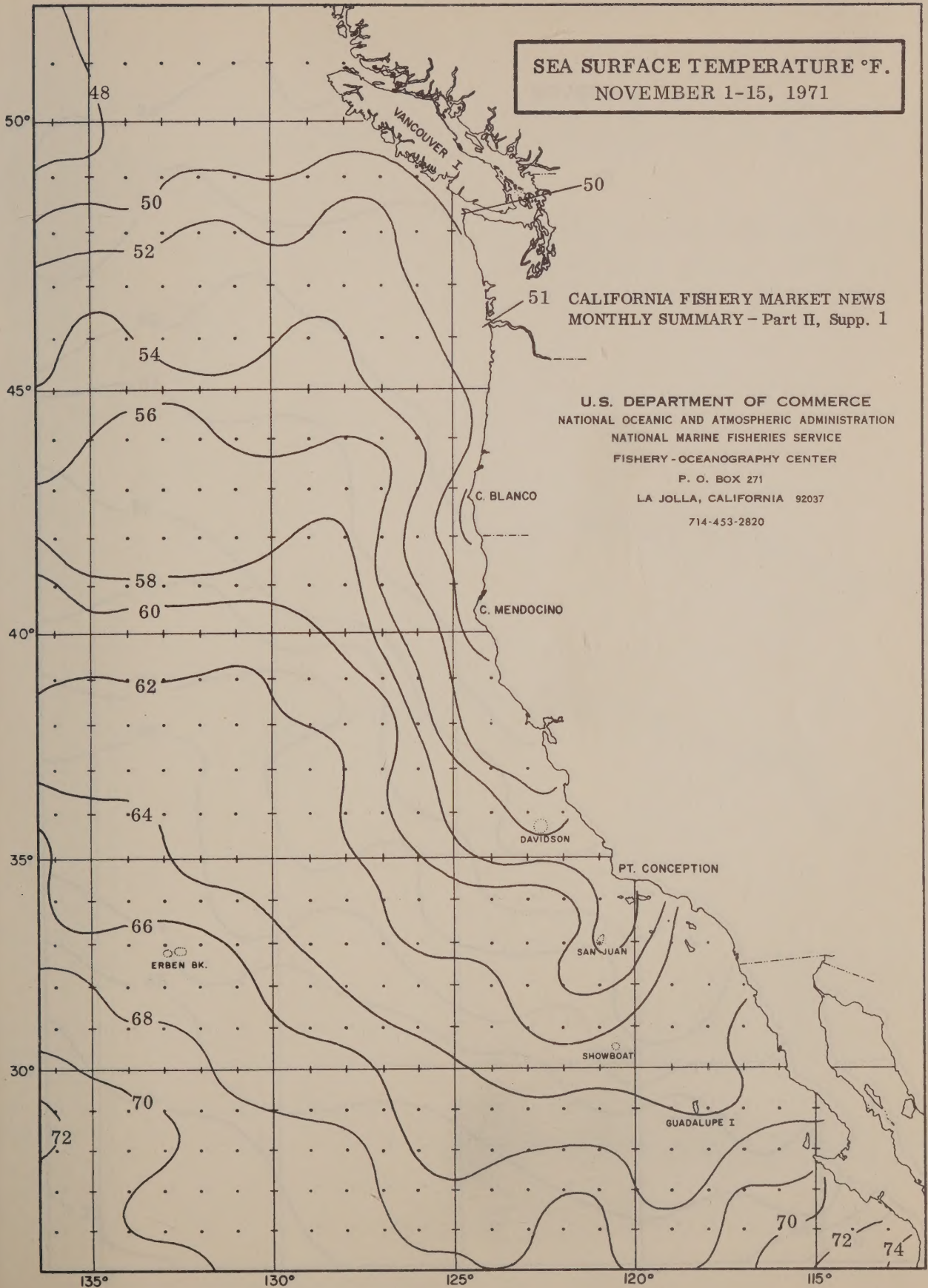
-0000-BAROMETRIC PRESSURE
(MILLIBARS).

RESULTANT WIND DIRECTION.

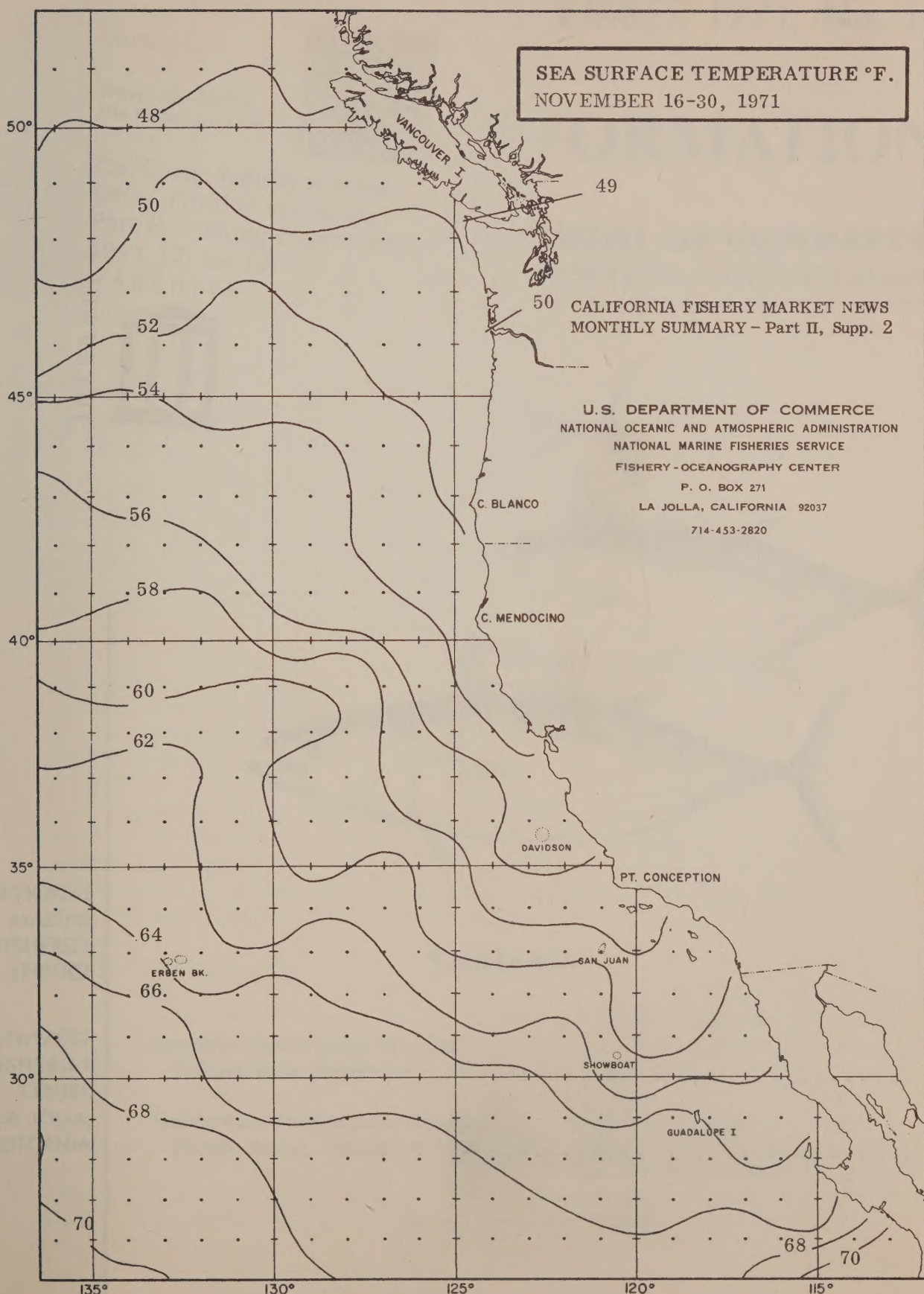
No. RESULTANT WIND SPEED (KTS.).
No. AVERAGE WIND SPEED (KTS.)
REGARDLESS OF DIRECTION.



SEA SURFACE TEMPERATURE °F.
NOVEMBER 1-15, 1971



SEA SURFACE TEMPERATURE °F.
NOVEMBER 16-30, 1971



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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
FISHERY-OCEANOGRAPHY CENTER
P. O. BOX 271
LA JOLLA, CALIFORNIA 92037
714-453-2820

